

In the Claims

A complete listing of the claims follows immediately hereinafter.

1. (original) A system for processing a treatment object having a given emission spectrum at a treatment object temperature which causes the treatment object to produce a treatment object radiated energy, said system comprising:

 a heating arrangement for heating the treatment object using a heating arrangement radiated energy having a heat source emission spectrum at a heat source operating temperature which heat source emission spectrum is different from said given emission spectrum of the treatment object; and

 chamber defining means for use in exposing said treatment object to a portion of the heating arrangement radiated energy while supporting said treatment object within a treatment chamber such that a first fraction of the heating arrangement radiated energy and a second fraction of the treatment object radiated energy are incident on a wall arrangement which forms part of the chamber defining means, and at least a portion of said wall arrangement is configured for responding in a first way to a majority of the first fraction of the heating arrangement radiated energy that is incident thereon and for responding in a second way to a majority of the second fraction of the treatment object radiated energy that is incident thereon.

2. (original) The system of claim 1 wherein said portion of the wall arrangement is configured to respond in said first way by reflecting said majority of the heat source radiated energy and to respond in said second way by absorbing said majority of the treatment object radiated energy.

3. (original) The system of claim 2 wherein said chamber defining means presents a first reflectance spectrum to said first fraction of said heat source radiated energy and presents a second, different reflectance spectrum to the second fraction of the treatment object radiated energy.

4. (original) The system of claim 2 wherein said portion of the wall arrangement reflects more than about 75% of the heat source radiated energy while absorbing more than about 75% of the treatment object radiated energy.

5. (original) The system of claim 2 wherein said portion of the wall arrangement reflects at least 60% of the heat source radiated energy while absorbing at least 60% of the treatment object radiated energy.

6. (original) The system of claim 2 wherein at least said portion of said wall arrangement includes an inner layer of material which responds at least in said second way.

7. (original) The system of claim 6 wherein said inner layer of material includes a thickness in a range from 1 nm to 1.5 mm.

8. (original) The system of claim 6 wherein said wall arrangement includes an arrangement of metallic walls which support said inner layer of material.

9. (original) The system of claim 8 wherein said metallic walls include aluminum.

10. (original) The system of claim 6 wherein said inner layer of material includes at least one of aluminum oxide

and titanium dioxide.

11. (original) The system of claim 6 wherein said inner layer of material includes an oxide of at least one element.

12. (original) The system of claim 10 wherein said inner layer includes a thickness in the range of approximately 1 nm to 1.5 millimeter.

13. (original) The system of claim 6 wherein said inner layer of material includes a polymer.

14. (original) The system of claim 13 wherein said polymer contributes at least partially to the response of the wall arrangement in at least one of said first way and said second way.

15. (original) The system of claim 13 wherein said inner layer includes a filler with said polymer.

16. (original) The system of claim 15 wherein said polymer includes a selective reflectivity characteristic and said filler modifies the selective reflectivity characteristic of the polymer as a base coating material.

17. (original) The system of claim 16 where said filler includes at least one of aluminum oxide particles, titanium dioxide particles, glass particles, and glass fibers.

18. (original) The system of claim 2 wherein said wall arrangement includes one or more chamber wall members which cooperate to define an interior periphery and said interior periphery supports one or more sheet members for receiving the first fraction of the heating arrangement radiated energy and for receiving the second fraction of the treatment object radiated energy such that the sheet members respond at least in the second way by absorbing the majority of the second fraction of said treatment object radiated energy incident thereon.

19. (original) The system of claim 2 wherein said wall arrangement includes one or more chamber wall members which cooperate to define an interior periphery and said interior periphery supports one or more sheet members for receiving the first fraction of the heating arrangement radiated energy and for receiving the second fraction of the treatment object radiated energy such that the sheet members respond in said first way and said second way.

20. (original) The system of claim 2 wherein said wall arrangement is configured for supporting a layer of flowable material in a way which exposes the flowable material to said heat source radiated energy and said treatment object radiated energy such that said flowable material responds in at least one of said first way and said second way.

21. (original) The system of claim 20 wherein said wall arrangement includes (i) one or more chamber wall members which cooperate to define an interior periphery and (ii) a transparent wall member supported between at least a portion of said interior periphery and said substrate so as to define a passage between said portion of the interior periphery and the transparent wall member such that said flowable material is exposed to the heat source radiated energy and the treatment object radiated energy through said transparent wall member.

22. (original) The system of claim 20 wherein said flowable material further serves to cool the chamber defining

means.

23. (original) The system of claim 20 wherein said flowable material is a liquid.

24. (original) The system of claim 23 wherein said liquid includes water.

25. (original) The system of claim 23 wherein said liquid includes deuterated water.

26. (original) The system of claim 23 wherein said liquid includes deuterium oxide.

27. (original) The system of claim 20 wherein said flowable material is gaseous.

28. (original) The system of claim 20 wherein said wall arrangement includes an outer wall and an inner wall that is spaced inwardly nearer said treatment object to define a cavity between the inner wall and the outer wall for receiving said flowable material and said flowable material is received therein.

29. (original) The system of claim 28 wherein said inner wall is substantially transparent to said heat source radiated energy and said treatment object radiated energy.

30. (original) The system of claim 28 wherein said inner wall is substantially transparent to said heat source radiated energy while being substantially opaque to said treatment object radiated energy.

31. (original) The system of claim 2 wherein said wall arrangement includes at least one of a single layer thin-film coating and a thin-film stack which responds at least in said first way to reflect the majority of the heat source radiated energy.

32. (original) The system of claim 2 wherein said wall arrangement includes a layered configuration that is made up of at least two layers such that an inner layer is nearest said treatment object.

33. (original) The system of claim 32 wherein said inner layer is attached directly to an adjacent, outward layer.

34. (original) The system of claim 33 wherein said adjacent layer produces a contaminant with direct exposure to said treatment object at least during said processing and said inner layer blocks said contaminant from reaching the treatment object.

35. (original) The system of claim 34 wherein said adjacent layer responds in both said first way and said second way.

36. (original) The system of claim 32 wherein said layered configuration includes an additional layer that is spaced outwardly from said inner layer such that a cavity is formed between said additional layer and said inner layer for supporting a fluid layer such that the fluid layer serves as a second layer and the additional layer serves as a third layer within said layered configuration.

37. (original) The system of claim 36 wherein said additional layer produces a contaminant with direct exposure to said treatment object at least during said processing and said inner layer blocks said contaminant from reaching the treatment object.

38. (original) The system of claim 36 wherein said fluid layer responds in said first way and said second way.

39. (original) The system of claim 36 wherein said additional layer responds in said first way and said fluid layer responds in at least said second way.

40. (original) The system of claim 36 wherein said fluid layer produces a contaminant with direct exposure to said treatment object and said inner layer blocks said contaminant from reaching the treatment object.

41. (original) The system of claim 32 wherein said layered configuration includes a thin-film stack.

42. (original) The system of claim 41 wherein said thin-film stack serves as said inner layer, nearest the treatment object in the layered configuration, and is supported by an adjacent layer which cooperates with the thin-film stack to respond in said first way and said second way.

43. (original) The system of claim 1 wherein said portion of the wall arrangement provides at least a general drop in reflectivity, with increasing wavelength, that cooperates with the given emission spectrum of the treatment object and the heat source emission spectrum of the heating arrangement for causing the portion of the wall arrangement to respond in the first and second ways.

44. (original) The system of claim 43 wherein said general drop in reflectivity occurs primarily in a range from approximately 1 μm to 10 μm .

45. (original) The system of claim 43 wherein said general drop in reflectivity occurs at least approximately between 2 μm and 3 μm .

46. (original) The system of claim 1 wherein said wall arrangement is formed using one or more wall members, each wall member including an overall thickness that responds in said first way and said second way.

47. (original) The system of claim 46 wherein said wall members are formed from at least one of opaque quartz and alumina.

48. (original) The system of claim 1 wherein said wall arrangement includes an inner surface arrangement having a surface roughness that at least contributes to said chamber responding in said first and second ways.

49-59. (canceled)

60. (original) The system of claim 1 wherein said portion of the wall arrangement covers a treated surface area that is approximately 20 percent or more of a total surface area that is defined by the wall arrangement.

61. (original) In a system for processing a treatment object having a given emission spectrum at a treatment object temperature which causes the treatment object to produce a treatment object radiated energy, a method comprising:

providing a heating arrangement for heating the treatment object using a heat source radiated energy having a heat source emission spectrum at a heat source operating temperature which heat source emission spectrum is different from said given emission spectrum of the treatment object; and

defining a treatment chamber using chamber defining means for use in exposing said treatment object to a portion of the heating arrangement radiated energy while supporting said treatment object within the treatment chamber such that a first fraction of the heating arrangement radiated energy and a second fraction of the treatment object radiated energy are incident on a wall arrangement which forms part of the chamber defining means; and

configuring at least a portion of said wall arrangement to respond in a first way to a majority of the first fraction of the heating arrangement radiated energy that is incident thereon and to respond in a second way to a majority of the second fraction of the treatment object radiated energy that is incident thereon.

62. (original) The method of claim 61 wherein said portion of the wall arrangement is configured to respond in said first way by reflecting said majority of the heat source radiated energy and to respond in said second way by absorbing said majority of the treatment object radiated energy.

63. (original) The method of claim 62 wherein said chamber defining means is configured for presenting a first reflectivity spectrum to said first fraction of said heat source radiated energy and for presenting a second, different reflectivity profile to the second fraction of the treatment object radiated energy.

64. (original) The method of claim 62 wherein said portion of the wall arrangement reflects more than 75% of the heat source radiated energy while absorbing more than 75% of the treatment object radiated energy.

65. (original) The method of claim 62 wherein said portion of the wall arrangement reflects at least 60% of the heat source radiated energy while absorbing at least 60% of the treatment object radiated energy.

66. (original) The method of claim 62 including the step of forming said treatment chamber with an inner layer of material at least for said portion of the wall arrangement which responds at least in said second way.

67. (original) The system of claim 66 wherein said inner layer of material includes a thickness in a range from 1 nm to 1.5 mm.

68. (original) The method of claim 66 including the steps of forming said wall arrangement using an arrangement of metallic walls and supporting said inner layer of material therewith.

69. (original) The method of claim 68 wherein said metallic walls are formed to include aluminum.

70. (original) The method of claim 66 wherein said inner layer of material is formed to include at least one of aluminum oxide and titanium dioxide.

71. (original) The method of claim 66 wherein said inner layer of material includes an oxide of at least one

element.

72. (original) The method of claim 70 wherein said inner layer is configured with a thickness in the range of approximately 1 nm to 1.5 millimeter.

73. (original) The method of claim 66 wherein said inner layer of coating material includes a polymer.

74. (original) The method of claim 66 including the step of using said polymer to contribute at least partially to the response of the wall arrangement in at least one of said first way and said second way.

75. (original) The method of claim 73 including the step of using a filler as part of said inner layer with said polymer.

76. (original) The method of claim 75 wherein said filler modifies a selective reflectivity of the polymer as a base coating material.

77. (original) The method of claim 76 including the step of providing at least one of aluminum oxide particles, titanium dioxide particles, glass particles, and glass fibers in said filler.

78. (original) The method of claim 62 wherein said wall arrangement is formed using one or more chamber wall members which cooperate to define an interior periphery and including the step of supporting one or more sheet members with said interior periphery to form an inner surface of the chamber defining means such that the sheet members respond at least in the second way by absorbing the majority of the first fraction of said treatment object radiated energy incident thereon.

79. (original) The method of claim 62 wherein said wall arrangement is configured using one or more chamber wall members which cooperate to define an interior periphery and including the step of supporting one or more sheet members using said interior periphery for receiving the first fraction of the heating arrangement radiated energy and for receiving the second fraction of the treatment object radiated energy such that the sheet members respond in said first way and said second way.

80. (original) The method of claim 62 wherein said wall arrangement is configured for supporting a layer of flowable material in a way which exposes the flowable material to said heat source radiated energy and said treatment object radiated energy such that said flowable material responds in at least one of said first way and said second way.

81. (original) The method of claim 80 wherein said wall arrangement includes one or more chamber wall members which cooperate to define an interior periphery and including the step of supporting a transparent wall member between at least a portion of said interior periphery and said substrate so as to define a passage between said portion of the interior periphery and the transparent wall member such that said flowable material is exposed to the heat source radiated energy and the treatment object radiated energy through said transparent wall member.

82. (original) The method of claim 80 including the step of using the layer of said flowable material to cool the

chamber defining means.

83. (original) The method of claim 80 including the step of using a liquid as said flowable material.

84. (original) The method of claim 83 including using water as at least a portion of said liquid.

85. (original) The method of claim 83 including using deuterated water as at least a portion of said liquid.

86. (original) The method of claim 83 including using deuterium oxide in said liquid.

87. (original) The method of claim 80 including the step of using a gas as said flowable material.

88. (original) The method of claim 80 including the steps of forming said wall arrangement to include an outer wall and an inner wall that is spaced inwardly nearer said treatment object to define a cavity between the inner wall and the outer wall for receiving said flowable material and causing said flowable material to be received therein.

89. (original) The method of claim 88 including the step of selecting said inner wall to be substantially transparent to said heat source radiated energy and said treatment object radiated energy.

90. (original) The method of claim 88 including the step of selecting said inner wall to be substantially transparent to said heat source radiated energy while being substantially opaque to said treatment object radiated energy.

91. (original) The method of claim 62 including forming at least one of a single layer thin-film coating and a thin-film stack as part of said wall arrangement which responds at least in said first way to reflect the majority of the heat source radiated energy.

92. (original) The method of claim 62 including the step of forming said chamber defining means to include a layered configuration that is made up of at least two layers such that an inner layer is nearest said treatment object.

93. (original) The method of claim 92 including the step of attaching said inner layer directly to an adjacent, outward layer.

94. (original) The method of claim 93 wherein said adjacent layer produces a contaminant with direct exposure to said treatment object at least during said processing and said inner layer blocks said contaminant from reaching the treatment object.

95. (original) The method of claim 94 including the step of selecting said adjacent layer to respond in both said first way and said second way.

96. (original) The method of claim 92 including the step of providing an additional layer, as part of the layered configuration, that is spaced outwardly from said inner layer to form a cavity between said additional layer and said inner layer for supporting a fluid layer such that the fluid layer serves as a second layer and the additional layer serves as a third layer within said layered configuration.

97. (original) The method system of claim 96 wherein said additional layer produces a contaminant with direct exposure to said treatment object at least during said processing and including the step of selecting said inner layer to block said contaminant from reaching the treatment object.

98. (original) The method of claim 96 including the step of selecting said fluid layer to respond in said first way and said second way.

99. (original) The method of claim 96 wherein said additional layer is selected to respond in said first way and said fluid layer is selected to respond in at least said second way.

100. (original) The method of claim 96 wherein said fluid layer produces a contaminant with direct exposure to said treatment object and including the step of selecting said inner layer to block said contaminant from reaching the treatment object.

101. (original) The method of claim 92 including the step of forming a thin-film stack as at least a portion of said layered configuration.

102. (original) The method of claim 101 including the steps of forming said thin-film stack to serve as said inner layer, nearest the treatment object in the layered configuration, supporting the thin film stack using an adjacent layer which cooperates with the series of thin-film coatings to respond in said first way and said second way.

103. (original) The method of claim 61 wherein said portion of the chamber defining means is configured to provide at least a general drop in reflectivity, with increasing wavelength, that cooperates with the given emission spectrum of the treatment object and the heat source emission spectrum of the heating arrangement for causing the chamber means to respond in the first and second ways.

104. (original) The method of claim 103 wherein said general drop in diffuse reflectivity occurs primarily in a range from approximately 1 μ m to 10 μ m.

105. (original) The method of claim 43 wherein said general drop in diffuse reflectivity occurs at least approximately between 2 μ m and 3 μ m.

106. (original) The method of claim 61 including the step of forming said wall arrangement using a one or more wall members, each wall member including an overall thickness that responds in said first way and said second way.

107. (original) The method of claim 106 including the step of using at least one of opaque quartz and alumina to form said wall members.

108. (original) The method of claim 61 wherein said wall arrangement includes an inner surface arrangement and including the step of forming a surface roughness that at least contributes to said chamber responding in said first and second ways.

109-120. (canceled)

121. (original) The method of claim 61 wherein said portion of the wall arrangement covers a treated surface area that is approximately 20 percent or more of a total surface area that is defined by the wall arrangement.

122. (original) For use in a system for processing a treatment object, said system being usable with an unmodified chamber arrangement for receiving and supporting the treatment object during processing, said unmodified chamber arrangement providing a given maximum cooling rate of said treatment object after being heated within the unmodified chamber arrangement, a modified chamber arrangement that is usable in the system as an alternative to the unmodified chamber arrangement, said modified chamber arrangement comprising:

chamber defining means for supporting said treatment object therein and configured for use in providing a modified maximum cooling rate that is greater than said given maximum cooling rate.

123. (original) The modified chamber arrangement of claim 122 wherein said given heating arrangement exhibits a heating arrangement emission spectrum at an operating temperature and said treatment object is heated to a treatment object temperature so as to exhibit a treatment object emission spectrum which is different from the heating arrangement emission spectrum and said chamber defining means is configured to respond in a first way to the heating arrangement emission spectrum while responding in a second way to the treatment object emission spectrum to provide said modified maximum cooling rate.

124. (original) The modified chamber arrangement of claim 123 wherein said chamber defining means includes an interior periphery that is configured with a selective reflectivity which responds in said first way and said second way.

125. (original) The modified chamber arrangement of claim 124 wherein said interior periphery is defined by an inner layer including an oxide of at least one element.

126. (original) The modified chamber arrangement of claim 125 wherein said inner layer includes at least one of aluminum oxide and titanium dioxide.

127. (original) The modified chamber arrangement of claim 125 wherein said inner layer includes a thickness in a range from approximately 1 nm to 1.5 millimeter.

128. (original) The modified chamber arrangement of claim 122 wherein the unmodified chamber arrangement cooperates with the treatment object to produce a given heat loss efficiency from the treatment object and wherein said chamber defining means, when used with said treatment object, produces a modified heat loss efficiency that is greater than said unmodified heat loss efficiency.

129. (original) For use in a system for processing a treatment object, said system being usable with an unmodified chamber arrangement for receiving and supporting the treatment object during processing, said unmodified chamber arrangement providing a given maximum cooling rate of said treatment object after heating within the unmodified chamber arrangement, a method comprising:

configuring modified chamber defining means for supporting said treatment object therein and for use in providing a modified maximum cooling rate of said treatment object that is greater than said given maximum cooling rate.

130. (original) The method of claim 129 wherein said given heating arrangement exhibits a heating arrangement emission spectrum at an operating temperature and said treatment object is heated to a treatment object temperature, during said processing, so as to exhibit a treatment object emission spectrum which is different from the heating arrangement emission spectrum and wherein said chamber defining means is configured to respond in a first way to the heating arrangement emission spectrum while responding in a second way to the treatment object emission spectrum to provide said modified maximum cooling rate.

131. (original) The method of claim 130 including the step of forming an interior periphery of said chamber defining means having at least an inner layer that is configured with a selective reflection profile which responds in said first way and said second way.

132. (original) The method of claim 131 including the step of using at least one of aluminum oxide and titanium dioxide to form said inner layer.

133. (original) The method of claim 127 wherein said inner layer is formed to include a thickness from approximately 1nm to 1.5 millimeter.

134. (original) The method of claim 129 wherein the unmodified chamber arrangement cooperates with the treatment object to produce a given heat loss efficiency from the treatment object and including the step of using said chamber defining means so as to produce a modified heat loss efficiency that is greater than said unmodified heat loss efficiency.

135. (original) A system for processing a treatment object having a given emission spectrum at a treatment object temperature which causes the treatment object to produce a treatment object radiated energy, said system comprising:

a heating arrangement for heating the treatment object using a heat source radiated energy having a heat source emission spectrum at a heat source operating temperature which heat source emission spectrum is different from said given emission spectrum of the treatment object; and

chamber defining means for use in exposing said treatment object to a portion of the heating arrangement radiated energy while supporting said treatment object within a treatment chamber such that a first fraction of the heating arrangement radiated energy and a second fraction of the treatment object radiated energy are incident on a wall arrangement which forms a part of the chamber defining means, and at least a portion of said wall arrangement configured to respond with selective reflectivity to said first fraction of the heating arrangement radiated energy and said second fraction of the treatment object radiated energy.

136. (original) In a system for processing a treatment object having a given emission spectrum at a treatment object temperature which causes the treatment object to produce a treatment object radiated energy, a method comprising:

heating the treatment object using a heating arrangement having a heat source radiated energy and a heat source emission spectrum at a heat source operating temperature which heat source emission spectrum is different from said given

emission spectrum of the treatment object;

exposing said treatment object to a portion of the heating arrangement radiated energy while supporting said treatment object within a treatment chamber, that is defined by chamber defining means, such that a first fraction of the heating arrangement radiated energy and a second fraction of the treatment object radiated energy are incident on a wall arrangement which forms part of the chamber defining means; and
configuring said wall arrangement to respond with selective reflectivity to said first fraction of the heating arrangement radiated energy and said second fraction of the treatment object radiated energy.

137-167. (canceled)